238.—(Revised.)

United States Department of Agriculture,

OFFICE OF EXPERIMENT STATIONS,

A. C. True, Director.

LIST OF PUBLICATIONS OF THE OFFICE OF EXPERIMENT STATIONS ON THE FOOD AND NUTRITION OF MAN.

FOR GRATUITOUS DISTRIBUTION.

(Requests for these publications should be sent to the Secretary of Agriculture or to a Senator or Representative or Delegate in Congress.)

Farmers' Bulletin No. 34.—Meats: Composition and Cooking. By Chas. D. Woods. Pp. 29, figs. 4, charts 4.

This contains concise explanatory statements regarding the structure, composition, texture, flavor, and digestibility of meats; practical suggestions regarding different methods of cooking meats; and tables showing the composition and fuel value of different kinds and cuts of meat.

Farmers' Bulletin No. 74.—Milk as Food. Pp. 39, charts 2.

Treats of the nutritive value of milk, and contains suggestions as to combinations with other food materials to make well-balanced and economical dietaries.

Farmers' Bulletin No. 85.—Fish as Food. By C. F. Langworthy, Ph. D. Pp. 30.

Shows the food value of fish, the great importance of the fisheries of the United States, and the immense amount of nutritive material taken each year from the salt and fresh waters of this country.

Farmers' Bulletin No. 93.—Sugar as Food. By Mary Hinman Abel. Pp. 27.

The characteristics of cane sugar and other sorts of sugar are discussed, as well as the value of sugar as a food. The practical use of sugar in the diet of children and adults is spoken of, and general conclusions drawn as to the amount of sugar desirable in the diet and the form in which it may be consumed.

Farmers' Bulletin No. 112.—Bread and the Principles of Bread Making. By Helen W. Atwater. Pp. 39, figs. 3.

The results of a large number of experiments at the different experiment stations and at other American and foreign institutions on different problems connected with bread and bread making are summarized, as well as the information on these topics afforded by standard works. It is not the object of this bulletin to give recipes for making bread, but to explain the reason for the different steps in bread making in the light of recent investigations.

Farmers' Bulletin No. 121.—Beans, Peas, and Other Legumes as Foods. By Mary Hinman Abel. Pp. 32, figs. 10.

Beans, peas, lentils, and other legumes, used fresh or dried, as articles of diet are described, and their food value as compared with other vegetables and with animal foods is discussed. The principles which govern the cooking of leguminous vegetables are treated, and statistics are given of the use of such foods and their importance in the diet.

Farmers' Bulletin No. 128.—Eggs and Their Uses as Food. By C. F. Langworthy, Ph. D. Pp. 30.

The composition of hen, duck, turkey, goose, and guinea fowl eggs is given, together with that of some egg products and egg substitutes. The bulletin dis-

cusses the food value of eggs, their flavor, digestibility, place in the diet, and related topics, as well as the preservation and marketing of eggs.

Farmers' Bulletin No. 142.—The Nutritive and Economic Value of Food. By W. O. Atwater, Ph. D. Pp. —, charts 2.

Definitions are given of the principal terms used in discussions of food and nutrition, and the general laws of the subject are spoken of. Special attention is paid to the composition of food, dietary studies, digestibility, pecuniary economy of foods, and related topics, the text being supplemented by tables and charts. Errors in food economy are pointed out and practical suggestions made.

Circular No. 46.—The Functions and Uses of Food. By C. F. Langworthy, Ph. D. Pp. 10.

Definitions of a number of the terms used in discussing food and a statement of some principles of nutrition. The average composition of a number of the more common American foods is quoted, as well as the commonly accepted dietary standards.

Some Results of Dietary Studies in the United States. By A. P. Bryant. Pp. 14. Reprinted from Yearbook of Department of Agriculture for 1898.

A popular article describing methods of making dietary studies and discussing the differences in the food habits of people of different occupations and conditions—such as farmers, mechanics, Mexicans, negroes, and others. Some ways in which the results of dietary studies may be made practically useful are pointed out.

Development of the Nutrition Investigations of the Department of Agriculture. By A. C. True, Ph. D., and R. D. Milner, Ph. B. Pp. 16. Reprinted from Yearbook of Department of Agriculture for 1899.

An historical and statistical account of the nutrition investigations conducted under the auspices of this Department. Many references are also made to American work which antedates these investigations and to later work conducted at American universities and other institutions.

The Value of Potatoes as Food. By C. F. Langworthy, Ph. D. Pp. 16, figs. 3. Reprinted from Yearbook of Department of Agriculture for 1900.

The structure and composition of the potato are spoken of, together with the changes brought about in cooking, the digestibility, place in the diet, and related topics.

FOR SALE.

(To secure these publications, address the Superintendent of Documents, Union Building, Washington, D. C., inclosing price given. Remittances must be made by cash or United States postal order. Postage stamps and checks not accepted.)

Bulletin No. 21.—Methods and Results of Investigations on the Chemistry and Economy of Food. By W. O. Atwater, Ph. D. Pp. 222, charts 3, figs. 15. Price 15 cents.

This bulletin discusses food and its uses, the composition of food materials, the digestibility of food, preparation and cooking, uses of food in the body, metabolism of energy, pecuniary economy of food, dietaries and dietary standards, and errors in food economy.

Bulletin No. 28 (revised).—The Chemical Composition of American Food Materials. By W. O. Atwater, Ph. D., and A. P. Bryant, M. S. Pp. 87, figs. 4. Price 5 cents.

This contains tables showing the maximum, minimum, and average composition and fuel value of a large number of different food materials.

Bulletin No. 29.—Dietary Studies at the University of Tennessee in 1895. By Chas. E. Wait, Ph. D., F. C. S., Professor of Chemistry, University of Tennessee. With comments by W. O. Atwater and Chas. D. Woods. Pp. 45. Price 5 cents.

An account of three dietary studies made with the college club of the University of Tennessee and one dietary study of a mechanic's family in Tennessee, with a discussion of the results.

Bulletin No. 31.—Dietary Studies at the University of Missouri in 1895, and Data Relating to Bread and Meat Consumption in Missouri. By H. B. Gibson, S. Calvert, and D. W. May, University of Missouri. With comments by W. O. Atwater and Chas. D. Woods. Pp. 24. Price 5 cents.

An account of two dietary studies made with the college club of the University of Missouri and compiled information obtained from the students of the University regarding bread and meat consumption at their homes.

Bulletin No. 32.—Dietary Studies at Purdue University, Lafayette, Ind., in 1895. By Winthrop E. Stone, Ph. D., Professor of Chemistry, Purdue University. With comments by W. O. Atwater and Chas. D. Woods. Pp. 28. Price 5 cents.

An account of dietary studies in the families of a teacher and a tinner in Indiana, with a discussion of the results.

Bulletin No. 35.—Food and Nutrition Investigations in New Jersey in 1895 and 1896. By Edward B. Voorhees, A. M., Director New Jersey Agricultural Experiment Stations. Pp. 40. Price 5 cents.

The subjects of these investigations were: (1) The composition and cost of bread in New Jersey; (2) bakery experiments; (3) the composition and cost of milk in cities in New Jersey; and (4) a dietary study. The objects of this work were to secure (1) definite data in regard to the variations in the cost per pound of bread, and (2) positive information concerning the variations that exist in the composition of bread and the relative cost per pound of the nutrients contained in it.

Bulletin No. 37.—Dietary Studies at the Maine State College in 1895. By Whitman H. Jordan, M. S., Director Maine Agricultural Experiment Station. Pp. 57. Price 5 cents.

This investigation may be termed a feeding experiment with man, as in it an attempt was made to control the sources of protein, which was furnished in cheap and in expensive forms. The influence of an abundance of milk in a dietary was also studied, and the results obtained were compared with those of a dietary study made under normal conditions. The investigation included five dietary studies at the college commons.

Bulletin No. 38.—Dietary Studies with Reference to the Food of the Negro in Alabama in 1895 and 1896. Conducted with the cooperation of the Tuskegee Normal and Industrial Institute, and the Agricultural and Mechanical College of Alabama. Reported by W. O. Atwater and Chas. D. Woods. Pp. 69, pls. 2. Price 5 cents.

Results of an inquiry into the food of the colored population of the Southern States, especially as regards the kinds, amounts, and composition of the food materials used. It embraces also a consideration of the hygienic and pecuniary economy of their diet, its deficiencies, the ways in which it might be improved, and the steps which should be taken to bring about an improvement.

Bulletin No. 40.—Dietary Studies in New Mexico in 1895. By Authur Goss, M. S., Professor of Chemistry, New Mexico College of Agriculture and Mechanic Arts. Pp. 23. Price 5 cents.

An account of two dietary studies with Mexican families of limited means and one study of a family in more comfortable circumstances. The composition

of a number of foods typical of this region in New Mexico is reported, and the dietary studies are discussed in relation to their environment and to results of similar studies made elsewhere.

Bulletin No. 43.—Losses in Boiling Vegetables, and the Composition and Digestibility of Potatoes and Eggs. By H. Snyder, B. S., Almah J. Frisbie, M. D., and A. P. Bryant, M. S. Pp. 31, figs. 7. Price 5 cents.

This bulletin contains three articles: The first, by H. Snyder, is entitled "The Loss of Nutrients in Boiling Potatoes, Carrots, and Cabbages," and reports a number of experiments on the losses which these vegetables undergo when boiled in different ways. The second, entitled "The Digestibility of Potatoes and Eggs," by H. Snyder, reports experiments on the digestibility of boiled eggs in pepsin solution and digestion experiments with a man on a mixed diet of which eggs were the principal constituent. The third article is entitled "The Composition of Different Parts of the Potato and the Loss of Nutrients During the Process of Boiling," by Almah J. Frisbie and A. P. Bryant, and reports the composition of different parts of the potato and experiments on the loss of nutrients when potatoes are boiled in different ways.

Bulletin No. 44.—Report of Preliminary Investigations on the Metabolism of Nitrogen and Carbon in the Human Organism with a Respiration Calorimeter of Special Construction. By W. O. Atwater, Ph. D., C. D. Woods, B. S., and F. G. Benedict, Ph. D. Pp. 64, figs. 4. Price 5 cents.

A detailed description of a respiration calorimeter suitable for experiments with man is given, and the methods and apparatus employed in the collection and analysis of the liquid, solid, and gaseous excretory products are described. Four experiments are reported in which the subjects remained in the respiration chamber for from three to twelve days. The foods and excretory products were analyzed and the balance of income and outgo of nitrogen and carbon determined.

Bulletin No. 45.—A Digest of Metabolism Experiments in which the Balance of Income and Outgo was Determined. By W. O. Atwater, Ph. D., and C. F. Langworthy, Ph. D. Pp. 434. Price 25 cents.

A compilation including 2,300 experiments with man and 1,400 with domestic animals in which the balance of income and outgo of nitrogen, or nitrogen and carbon, with or without oxygen, hydrogen, or mineral matter, was determined. The experiments are classified and arranged, and the tables of results are supplemented by text in which the experiments are described, the objects sought, the experimental methods employed, and the conclusions drawn being noted in more or less detail.

Bulletin No. 46.—Dietary Studies in New York City in 1895 and 1896. By W. O. Atwater, Ph. D., and Chas. D. Woods, B. S. Pp. 117. Price 10 cents.

An account of twenty-one dietary studies of families living in the congested portions of New York City, a family at a mission, and a day nursery at a mission. From the results obtained some deductions are drawn concerning improvements in the living of such families.

Bulletin No. 52.—Nutrition Investigations in Pittsburg, Pa., 1894–1896. By Isabel Bevier, Professor of Natural Science in the Pennsylvania College for Women, Pittsburg. Pp. 48. Price 5 cents.

The investigations reported in this bulletin are: (1) Six dietary studies—one of a professional man's family and five of families of mechanics and day laborers; (2) the composition and prices of bakers' bread in Pittsburg; and (3) the composition of bread and the changes which the materials undergo in baking.

Bulletin No. 53.—Nutrition Investigations at the University of Tennessee in 1896 and 1897. By Chas. E. Wait, Ph. D., F. C. S., Professor of Chemistry in the University of Tennessee. Pp. 46, figs. 2. Price 5 cents.

The investigations reported in this bulletin are: (1) Studies of the composition of different kinds of meat, including analyses of a side of native Tennessee beef divided into seventeen cuts, according to the usage of the Knoxville market, of a side of native Tennessee mutton divided into six cuts, and of twenty Tennessee chickens, as purchased in the open market; (2) dietary studies including two mechanics' families living in Knoxville, and two college clubs; and (3) twenty-one digestion experiments with healthy men.

Bulletin No. 54.—Nutrition Investigations in New Mexico in 1897. By Arthur Goss, M. S., Professor of Chemistry, New Mexico College of Agriculture and Mechanic Arts. Pp. 20, pl. 1, fig. 1. Price 5 cents.

This bulletin includes an analytical study of a side of New Mexico range beef which was regarded as typical. The results were compared with studies of beef raised in other regions. A dietary study of a poor Mexican family was also reported.

Bulletin No. 55.—Dietary Studies in Chicago in 1895 and 1896. Conducted with the cooperation of Jane Addams and Caroline L. Hunt of Hull House. Reported by W. O. Atwater and A. P. Bryant. Pp. 76. Price 5 cents.

In this bulletin fifty dietary studies among children, French, Canadians, orthodox Russian Jews, unorthodox Russian Jews, and Bohemians living in the thickly congested district of Chicago are reported, as well as three dietary studies of professional men living in comfortable circumstances. Results are discussed and compared with the results of dietary studies made elsewhere.

Bulletin No. 63.—Description of a New Respiration Calorimeter and Experiments on the Conservation of Energy in the Human Body. By W. O. Atwater, Ph. D., and E. B. Rosa, Ph. D. Pp. 94, pls. 8, figs. 12. Price 10 cents.

The special features of the respiration calorimeter, which have to do with the measurement of the income and outgo of energy, are described. Experiments testing the accuracy of the apparatus are reported in which heat was generated inside the respiration chamber by an electric current or by burning alcohol. Two experiments with a man were also reported.

Bulletin No. 66.—The Physiological Effect of Creatin and Creatinin and Their Value as Nutrients. By J. W. Mallet, M. D., LL. D., Professor of Chemistry in the University of Virginia. Pp. 24. Price 5 cents.

A number of experiments are reported. It was found that creatin and creatinin, which make up the greater part of the nitrogenous material of most meat extracts, do not serve as nutrients in the body. The creatinin is excreted unchanged, while creatin is changed wholly or very largely into creatinin.

Bulletin No. 67.—Studies on Bread and Bread Making. By Harry Snyder and L. A. Voorhees. Pp. 51, pls. 2, figs. 3. Price 10 cents.

Two separate papers are included. In the first, Professor Snyder reports the composition of a number of samples of Minnesota bread as compared with its cost; studies of the loss of dry matter, carbon, and nitrogen; the production of soluble carbohydrates and acid; the behavior of wheat proteids; and the changes in the solubility of fat during bread making. Digestion experiments with bread made from patent roller-process flour and bakers' grade flour are also included. Professor Voorhees, in the second paper, reports experiments on the loss of nutrients in bread making, noting especially the changes in the fat, and discusses his investigations in relation to the work of others along similar lines.

Bulletin No. 68.—A Description of Some Chinese Vegetable Food Materials and Their Nutritive and Economic Value. By Walter C. Blasdale, Instructor in Chemistry, University of California. Pp. 48, pls. 8. Price 10 cents.

The composition of a number of vegetable food materials in common use among the Chinese on the Pacific coast of the United States is reported and their food value, etc., discussed. The vegetable products include, among other materials, lotus roots and seeds, taro, lily bulbs and flowers, cassava, lichi nuts, Chinese olives, and water chestnuts.

Bulletin No. 69.—Experiments on the Metabolism of Matter and Energy in the Human Body. By W. O. Atwater, Ph. D., and F. G. Benedict, Ph. D., with the cooperation of A. W. Smith, M. S., and A. P. Bryant, M. S. Pp. 112. Price 10 cents.

A technical bulletin reporting progress in the experiments with the respiration calorimeter. The details of six experiments with healthy men are reported, in which the balance of income and outgo of matter and energy was determined. Check experiments, designed to show the accuracy of the apparatus, are also described in detail.

Bulletin No. 71.—Dietary Studies of Negroes in Eastern Virginia in 1897 and 1898. By H. B. Frissell, D. D., Principal of the Hampton Normal and Agricultural Institute, and Isabel Bevier, Professor of Chemistry at Lake Erie College. Pp. 45, pls. 3. Price 5 cents.

This bulletin includes two separate papers, which together report the details of nineteen dietary studies of negro families in Eastern Virginia. Some had been under the influence of Hampton Institute, others had not had such training, while many families had very limited incomes. The results are discussed and compared with those of dietary studies of negroes in Alabama, and with averages of studies of families of different occupations and incomes in other regions.

Bulletin No. 77.—Dietary Studies of University Boat Crews. By W. O. Atwater and A. P. Bryant. Pp. 72. Price 5 cents.

Dietary studies are reported of the Harvard and Yale university and freshman boat crews at their quarters at their respective universities and at Gales Ferry before the annual boat race. A study of the captain of the Harvard freshman crew at Gales Ferry was also made. These investigations were undertaken primarily to secure data regarding the food requirements of men performing severe muscular work. The diet of the boat crews was found to contain more protein and to furnish more energy than that of students not engaged in such exercise. These and other observed facts are discussed in relation to the results of other dietary studies and the commonly accepted theories of nutrition.

Bulletin No. 84.—Nutrition Investigations at the California Agricultural Experiment Station, 1896–1898. By E. M. Jaffa, M. S., Assistant Professor of Agriculture, University of California. Pp. 39. Price 5 cents.

This bulletin reports four dietary studies of infants, one of the university football team during training, and one of a chemist's family. A digestion experiment with an infant on a milk diet was also made, as well as a metabolism experiment in which the balance of income and outgo of nitrogen was determined. The results are discussed at considerable length.

Bulletin No. 85.—A Report of Investigations on the Digestibility and Nutritive Value of Bread. By Chas. D. Woods, Director, and L. H. Merrill, Chemist, Maine Agricultural Experiment Station. Pp. 51. Price 5 cents.

This technical bulletin is a progress report giving the results of experiments with men on the digestibility of bread of various kinds when eaten alone and when forming part of a simple mixed diet. Artificial digestion experiments with the same sorts of bread were also made, and the metabolic nitrogen in the feces and methods of estimating it were studied. In the experiments with men

the balance of income and outgo of nitrogen was determined. A test of skim milk versus water for use in mixing dough showed the value of the former, as the resulting bread was richer in protein than that mixed with water. The loss of nutrients which is observed in bread making was also studied.

Bulletin No. 89.—Experiments on the Effect of Muscular Work Upon the Digestibility of Food and the Metabolism of Nitrogen, conducted at the University of Tennessee, 1897 to 1899. By Chas. E. Wait, Ph. D., F. C. S., Professor of Chemistry at the University of Tennessee. Pp. 77. Price 5 cents.

Sixteen experiments are reported in which the effect of muscular work upon the digestibility of food and upon the metabolism of nitrogen was studied. The subjects were young men in good health and performed muscular work under different dietary conditions.

Bulletin No. 91.—Nutrition Investigations at the University of Illinois, North Dakota Agricultural College, and Lake Erie College, Ohio, 1896 to 1900. By H. S. Grindley and J. L. Sammis, E. F. Ladd, and Isabel Bevier and Elizabeth C. Sprague. Pp. 42. Price 5 cents.

This bulletin reports dietary studies. The two at the University of Illinois were made with the family of an instructor and a club of workingmen; the study at the North Dakota Agricultural College, with a club of woman students; and that at Lake Erie College also with a club of women, including students and instructors. The investigations are discussed and compared with the results of similar work carried on elsewhere in the United States.

Bulletin No. 98.—The Effect of Severe and Prolonged Muscular Work on Food Consumption, Digestion, and Metabolism. By W. O. Atwater, Ph. D., and H. C. Sherman, Ph. D., and the Mechanical Work and Efficiency of Bicyclers, by R. C. Carpenter, M. S. Pp. 67, figs. 3. Price 5 cents.

A six-day bicycle race at Madison Square Garden, New York City, afforded the authors an opportunity to study the effect of very severe and prolonged muscular work upon the consumption and digestibility of food and the metabolism of nitrogen. The results are compared with those obtained under other conditions of muscular work. In the chapter devoted to a consideration of the mechanical work and efficiency of bicyclers, the amount of work actually performed is discussed, as well as the efficiency of man considered as a machine, and related topics.

Bulletin No. 101.—Studies on Bread and Bread Making at the University of Minnesota in 1899 and 1900. By Harry Snyder, B. S., Professor of Chemistry, College of Agriculture, University of Minnesota, and Chemist of the Agricultural Experiment Station. Pp. 65, pls. 3, fig. 1. Price 5 cents.

Continuing earlier work, digestion experiments were made with bread from whole-wheat flour, graham flour, and standard patent flour, the flours all being ground from the same lot of hard Scotch Fife spring wheat. The standard patent flour, as shown by analysis, contained somewhat less total protein than the flours of lower grade but was more thoroughly digested. Artificial digestion experiments with bread of different kinds were made as well as studies of the effect on digestibility of consuming different amounts of oatmeal and of bread, the effect on digestibility of increasing the proportion of starch in bread, and experiments in bread making.

Bulletin No. 102.—Experiments on Losses in Cooking Meat, 1898–1900. By H. S. Grindley, D. Sc., Professor of Chemistry, College of Agriculture, University of Illinois, with the cooperation of H. McCormack, M. S., and H. C. Porter, M. S. Pp. 64. Price 5 cents.

Twenty-nine experiments on the losses of material when meat is fried, stewed, and boiled, are reported. The experimental methods followed are

described and the results are briefly discussed. The present bulletin is a progress report.

Bulletin No. 107.—Nutrition Investigations at the California Agricultural Experiment Station, 1899–1901. Nutrition Investigations Among Fruitarians and Chinese. By M. E. Jaffa, M. S., Assistant Professor of Agriculture, University of California. Pp. 43. Price 5 cents.

This bulletin includes six dietary studies, a digestion experiment, and a study of the metabolism of nitrogen made with persons living practically on a diet of fruit and nuts; also three dietary studies with Chinese engaged in light muscular work, moderate muscular work, and severe labor. The diet of the fruitarians furnished less nutrients and energy than the average diet of persons of similar age and occupation consuming ordinary foods. Instances are, however, on record in which persons consuming a mixed diet have lived on as small amounts. The diet of the Chinese corresponded quite closely as regards nutrients and energy to that of Americans engaged in similar work. Studies like those here reported are useful in determining dietary standards and in similar ways. The results obtained are discussed in relation to the general laws of nutrition.

PUBLICATIONS NO LONGER AVAILABLE.

(These publications can not be supplied by the Department of Agriculture or the Superintendent of Documents.)

Circular No. 43.—Foods—Nutrients—Food Economy. Pp. 6, diags. 2.

A very brief statement of the functions of food and the general principles of nutrition.

Farmers' Bulletin, No. 23.—Foods: Nutritive Value and Cost. By W. O. Atwater, Ph. D. Pp. 32, diags. 2. Replaced by Farmers' Bulletin No. 142.

This contains definitions of the technical terms used in discussing the nutritive value and economy of foods, tables, and explanations of the nutritive value of common food materials, and suggestions regarding errors to be avoided.

Bulletin No. 56.—History and Present Status of Instruction in Cooking in the Public Schools of New York City. Reported by Mrs. Louise E. Hogan, with an introduction by A. C. True, Ph. D. Pp. 70, pls. 12.

This bulletin includes an account of the introduction, growth, and present status of teaching cooking in the public schools of New York City. Sample lessons are quoted which show the course at present followed and exercises, both compositions and drawings prepared by pupils, are also given.

Foods for Man. Pp. 7. Reprinted from Yearbook of Department of Agriculture for 1897. Replaced by Circular No. 46.

The functions of food are briefly described, and the method of calculating a dietary is given, as well as the composition of a number of the more common food materials.

Food and Diet. By W. O. Atwater, Ph. D. (Charts I–IV, size 26 by 40 inches.)

Chart I.—Nutrients of Food and Their Uses in the Body. This shows in tabular form the composition of food materials as purchased, with examples of the different nutrients and functions of each. The definition of food is also given.

Chart II.—Composition of Food Materials. This shows by means of colored lines the composition and fuel value of a number of common food materials, both animal and vegetable.

Chart III.—Pecuniary Economy of Food. This gives the amount of a number of food materials which may be purchased for 10 cents, and shows by means of colored lines the composition and fuel value of each.

Chart IV.—Dietaries and Dietary Standards. This shows by means of colored lines the nutrients and fuel value of the dietaries consumed by the people of various conditions in the United States and other countries. The dietary standards for a man at little work, at moderate work, and at severe work are also given.